

*DUXBURY BEACH*

# Barrier Beaches

A Few Questions Answered



Massachusetts Coastal Zone Management

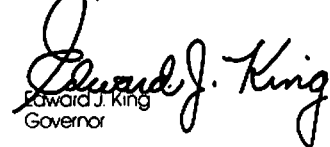
Dear Citizen:

The nation's coast is an important resource which needs to be protected. This boundary where the land meets the sea is unique in both its beauty, recreational use, and economic benefits.

In Massachusetts, as in other coastal states, maritime-dependent activities provided the basis for the establishment of many of the communities bordering our shore. Shipbuilding, commercial fishing and transportation are but a few of the many enterprises which flourished throughout the 18th and 19th centuries. Today the economy of our coastal zone continues to expand based on the same natural resources that encouraged the first settlers. As more people and economic interests are attracted to the coast, additional stress is placed on these resources. Barrier beaches, in particular, feel these pressures. Indiscriminate attempts to stabilize and control these dynamic areas have resulted in the expenditure of millions of tax dollars to repair homes and businesses damaged during coastal storms and more importantly - have cost human lives.

On August 8, 1980 I issued Executive Order No. 181 for Barrier Beaches. This Order directs all state agencies of the Commonwealth to adopt specific policies to reduce future storm damage on our barrier beaches. To help implement the Order, and to inform the public of the importance of barrier beaches, the Massachusetts Coastal Zone Management Office has developed this brochure. It is my sincere hope that this brochure will be used to increase awareness and understanding of one of our most vital and dynamic coastal resources - barrier beaches.

Sincerely,

  
Edward J. King  
Governor

COMMONWEALTH OF MASSACHUSETTS

By His Excellency

EDWARD J. KING

Governor

Preamble

A barrier beach is a narrow low-lying strip of land generally consisting of coastal beaches and coastal dunes extending roughly parallel to the trend of the coast. It is separated from the mainland by a narrow body of fresh brackish or saline water or marsh system. It is a fragile buffer that protects landward areas from coastal storm damage and flooding.

The strength of the barrier beach system lies in its dynamic character, its ability to respond to storms by changing to a more stable form. Frequently man induced changes to barrier beaches have decreased the ability of landform to provide storm damage prevention and flood control. Inappropriate development on barrier beaches has resulted in the loss of lives and great economic losses to residents and to local, state and federal governments. The taxpayer, who often cannot gain access to barrier beach areas, must subsidize disaster relief and flood insurance for these high hazard areas.

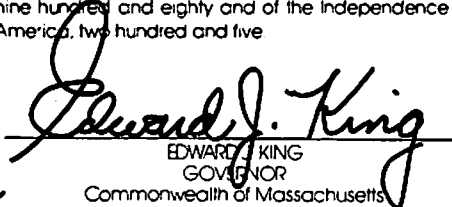
Since barrier beaches are presently migrating landward in response to rising sea level, future storm damage to development located on the barriers is inevitable.

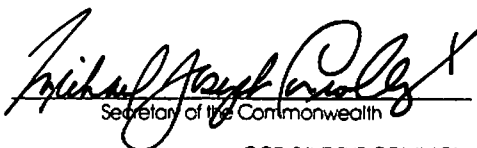
WHEREAS, the Commonwealth seeks to mitigate future storm damage to its barrier beach areas.

NOW, THEREFORE, I, Edward J. King, Governor of the Commonwealth of Massachusetts, by virtue of the authority vested in me by the Constitution and laws of the Commonwealth, do hereby order and direct all relevant state agencies to adopt the following policies:

1. Barrier beaches shall be given priority status for self-help and other state and federal acquisition programs and this priority status shall be incorporated into the Statewide Outdoor Comprehensive Recreation Plan. The highest priority for disaster assistance funds shall go towards relocating willing sellers from storm damaged barrier beach areas.
2. State funds and federal grants for construction projects shall not be used to encourage growth and development in hazard prone barrier beach areas.
3. For state-owned barrier beach property, management plans shall be prepared which are consistent with state wetland policy and shall be submitted to the Secretary of Environmental Affairs for public review under the provisions of the Massachusetts Environmental Policy Act.
4. At a minimum, no development shall be permitted in the velocity zones or primary dune areas of barrier beaches identified by the Department of Environmental Quality Engineering.
5. Coastal engineering structures shall only be used on barrier beaches to maintain navigation channels at in-lets and then only if mechanisms are employed to ensure that downdrift beaches are adequately supplied with sediment.
6. Dredge material of a compatible grain size shall be used for barrier beach nourishment, if economically feasible.
7. The Coastal Zone Management Office shall coordinate state agency management policy for barrier beach areas.

Given at the Executive Chamber in Boston this eighth day of August, in the year of Our Lord one thousand nine hundred and eighty and of the Independence of America, two hundred and five.

  
EDWARD J. KING  
GOVERNOR  
Commonwealth of Massachusetts

  
Secretary of the Commonwealth

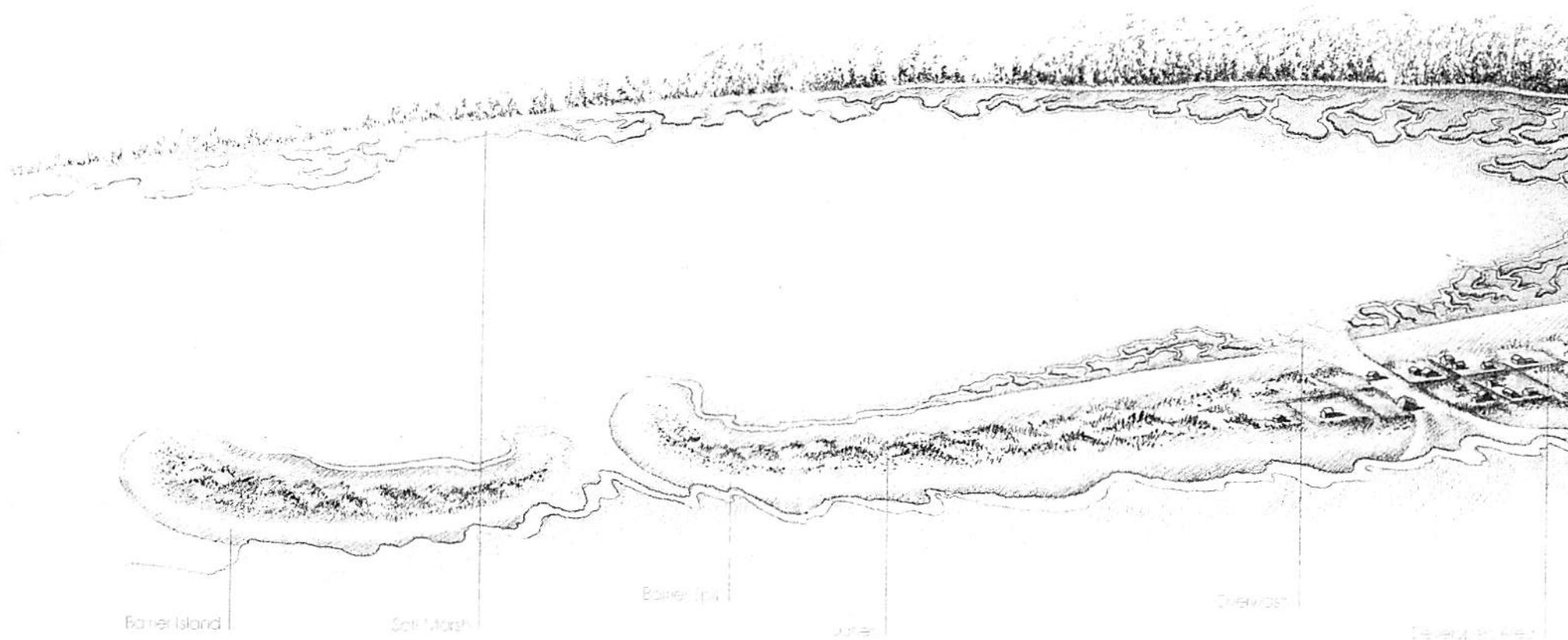
GOD SAVE THE COMMONWEALTH OF MASSACHUSETTS

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COMMONWEALTH OF MASSACHUSETTS  
Edward J. King, Governor

EXECUTIVE OFFICE OF ENVIRONMENTAL AFFAIRS  
John A. Bewick, Secretary

COASTAL ZONE MANAGEMENT  
Edward J. Reilly, Director  
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### What Is A Barrier Beach?

A barrier beach is a narrow strip of beach and dunes separated from the mainland by a marsh, bay or river. The gently sloping beach extends from above the high tide line to the offshore sand bar where waves first normally break. Dunes are hills or ridges of sand deposited by the wind and often covered with beachgrass. All of the dunes extending from the beach to the marsh, bay or river are part of the barrier beach. Together the beach and dunes make up a low-lying dynamic barrier beach system which provides a storm buffer for harbors, fertile estuaries, and mainland areas behind it.

There are three basic types of barrier beaches: bay barrier, barrier spit, and

barrier island. A bay barrier is connected to the mainland at both ends. A barrier spit is only connected at one end, and a barrier island is connected at either end. Examples of bay barriers in Massachusetts are: Peble Beach in Rockport, Peggotty Beach in Scituate, Ballston Beach in Truro, and Cockeest Pond Beach in Westport. Examples of barrier spits are: Wingersheek Beach in Gloucester, Revere Beach in Revere, Plymouth Beach in Plymouth, Sand Neck in Barnstable, Great Point in Nantucket, and Ocean Grove in Swansea. Examples of barrier islands are: Plum Island in Newburyport, Newbury, Rowley, and Ipswich, and Monomoy Island south of the Chatham mainland.

### Why and How Do Barrier Beaches Change?

Barrier beaches are always changing. In just a year's time these changes are quite evident. In the summer, when waves are small, the beach builds up becoming higher and wider. Storms that occur in the fall, winter and early spring, produce large waves which cut into the beach and cause it to narrow and flatten. Over a longer period of time, the entire barrier beach also tends to move landward. This occurs when storm waves break and carry sand from the ocean side over the beach and dunes, to the landward side. This movement also occurs when sand is swept through tidal inlets into the bays and rivers behind barrier

beaches. The landward movement of the barrier beach is caused by the gradual rise in sea level which Massachusetts and other areas of the East Coast have been experiencing for thousands of years. In some areas of the coast, the rate of landward movement is as much as several feet per year.

The strength of the barrier beach system lies in its natural dynamic character, its ability to respond to storms by changing to a more stable form. When left unaltered, barrier beaches respond to storm overwash by building up again. Beachgrass grows in the overwashed areas and traps windblown sand to begin the formation of new dunes. Eventually the barrier beach will

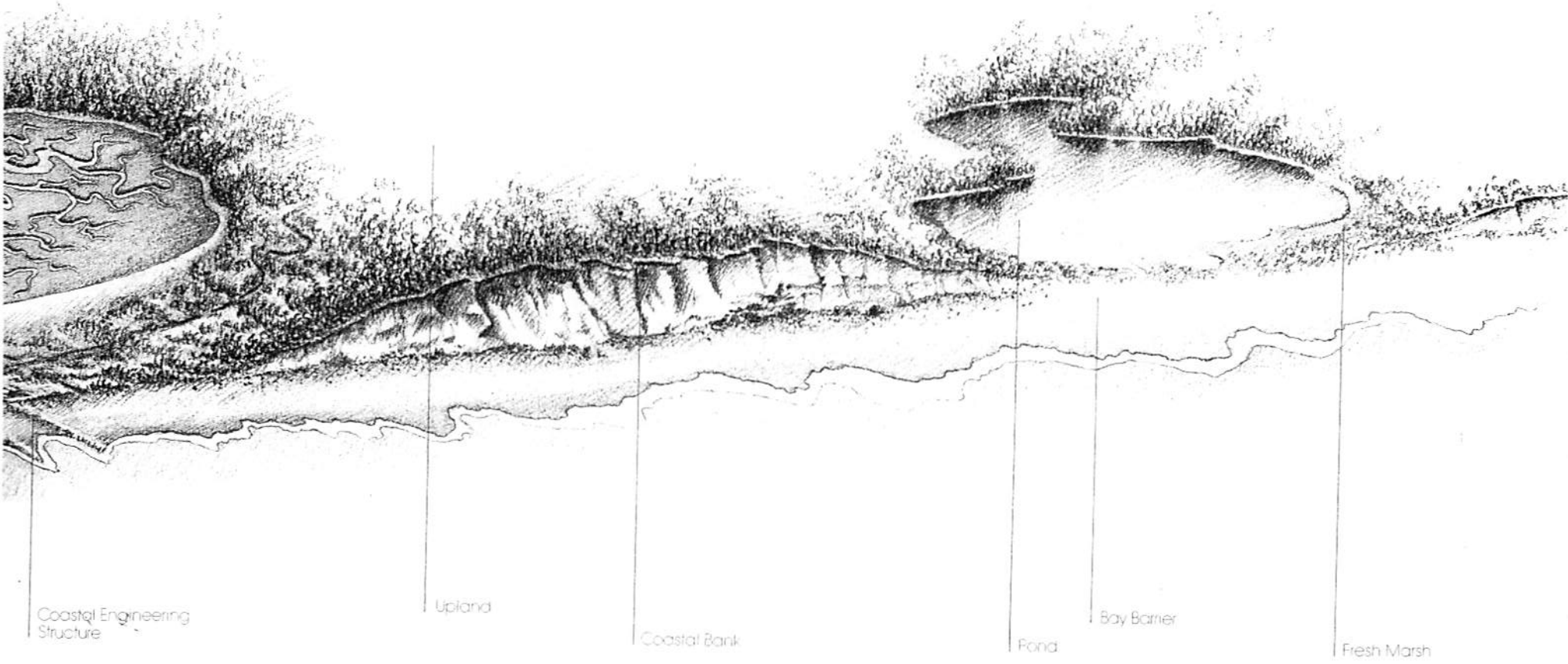
look much as it did before the storm, although it may now be slightly closer to the mainland.

In the past, the usual response to shoreline erosion and flooding was to build seawalls, groins or other structures in an attempt to protect the beach. Unfortunately, these protective structures and all other types of alterations (paving, bulldozing, etc.) interfere with the natural processes of the barrier beach. They prevent overwash and interfere with beachgrass and dune growth, contributing to erosion in surrounding areas. Not only do seawalls and groins contribute to erosion around them, they also cause the area in front of the structure to erode - the very area which the structure was built

to protect. These disturbances are very damaging to the system as a whole. Once the natural "healing" process is interrupted, the barrier beach no longer has any defenses against future storms.

### Why Should Citizens Be Concerned About Barrier Beaches?

Barrier beach development poses significant hazards to public life and health. In 1900 over 6,000 people lost their lives when a hurricane caused flooding and overwash of the barrier beach in Galveston, Texas. While storm



various systems have improved greatly since that tragedy, the number of people living on these hazard prone areas has also increased dramatically. There are other reasons why citizens should be interested in barrier beaches. Tax money is used to promote development in barrier beach areas. Citizens are currently helping to pay for subsidized loans and flood insurance, disaster assistance, and the development of roads, sewers, and water lines, etc. for these beaches. One estimate indicates that it could cost the state approximately \$11.2 billion in the next 20 years should the government continue to invest in barrier development. In Massachusetts alone, the 1978

Blizzard (a severe northeaster) cost the taxpayer \$180 million for direct coastal damage, much of this for barrier beach areas. Approximately two thirds of the 339 homes destroyed by that storm were located on barrier beaches. Many of these homes were behind seawalls and other erosion control structures which gave the homeowners a false sense of security. Those same seawalls had also contributed to beach erosion thereby reducing the natural storm defenses of the barrier beach. Most of these seawalls were reconstructed at public expense in much the same way as they had existed prior to the blizzard. For example, the large seawall and stone mound structure on Minal Beach

in Scituate has been reconstructed 19 times. Most recently it was reconstructed after the '78 Blizzard, with a cost to the taxpayer of over \$700,000! Despite the immense size of this structure many of the homes behind it will be heavily damaged by coastal storms.

**How Should We Manage Our Barrier Beaches?**

Executive Order No. 181, signed by Governor King in August of 1980, established a framework for the management of Barrier Beaches in Massachusetts. The order directs that

state acquisition of barrier beaches be made a priority. This order assigns the highest priority for use of disaster assistance funds to relocate willing sellers from storm damaged barrier beach areas. Also state and federal monies for construction projects will not be used to encourage growth and development on barrier beaches. These economic policies recognize barrier beaches as hazard-prone areas where future storm damage will inevitably occur.

Local governments also play an important role in barrier beach management. Since community boards and commissions review proposals for structures on barrier beaches, a large responsibility resides with these officials

to ensure that proposed activities reflect the natural and economic hazards characteristic of barrier beaches. Town administrators are also being strongly encouraged to develop management plans for town-owned barrier beach areas to prevent improper development.

A large effort is now underway by the Massachusetts Office of Coastal Zone Management to assist the public, state and local governments with barrier beach management. Maps which identify and delineate each barrier town in the state. A guide to the management of barrier beaches of Massachusetts will be published in the near future. In addition, workshops will be

held in each coastal region. This assistance will be available to help us better understand barrier beach processes so that we can better manage these fragile but dynamic coastal resources.

*The preparation of this publication was funded by the Office of Coastal Zone Management, National Oceanic and Atmospheric Administration, U.S. Department of Commerce, under a program implementation grant to the Commonwealth of Massachusetts.*